



# PATENT PROTECTION FOR AI-GENERATED INVENTIONS: INDIA'S STANCE AND GLOBAL PERSPECTIVES

**Author 1: Ankita Tiwari, Author 2: Divyansh Singh**

Designation: Final Year Law Student, Final Year Law Student

Name of Department: Amity Law School

Name of University: Amity University Madhya Pradesh, Gwalior, Madhya Pradesh, India

**Abstract:** The study explores the changing paradigm of patent protection for AI-based inventions in the global scenario through the lens of India. It delves into the existing legal structure in India, namely the Patents Act, 1970, and stance of the Indian Patent Office with regard to AI-related inventions. The paper highlights central issues in applying concepts of traditional patent law, including inventorship and inventive step, to AI-created creations. It compares Indian positions with those of existing approaches taken by other major jurisdictions, namely, the US, European Union, and UK. The study touches upon the absence of provisions related to AI inventorship under Indian law and the corresponding outcomes on innovation and economic development. It also highlights recent developments in case law and administrative decisions that may impact the trajectory of the policy going forward. It closes with recommendations for evolutionary changes we should make to our laws and policies to effectively navigate these challenges, helping to chart a radical but pragmatic course to ensure that we develop a balanced relationship that does not stifle innovation while still retaining the integrity of the patent system. This study is intended to study intellectual property rights and their impact and international regime in the globalized world as it is also a part of ongoing conversation on AI and IPRs and India's stance in it.

**KEYWORDS:** Artificial Intelligence, Patent Law, Inventorship, Indian Patent System, Technological Innovation

## INTRODUCTION

### A. Background on AI and its role in innovation

AI (Artificial Intelligence) Seizing the Performing Industry It includes methods like machine learning, neural networks, and other data-driven algorithmic techniques. They allow computers to carry out tasks normally requiring human intelligence. AI systems able to analyze massive datasets, identify patterns, and produce innovative solutions.<sup>1</sup>

In terms of innovation, 'AI is both a creative tool and an independent creative agent. It enhances human creativity by processing information at previously unscaled levels. AI systems can also spot hidden correlations and offer creative solutions. The ability has sparked advances in everything from drug discovery to materials science.<sup>2</sup> Furthermore, AI in innovation is not limited through data analytics only. State-of-the-art AIs can formulate hypotheses, plan experiments and even come up with inventions themselves. The new inventions generated by AI raise familiar questions about the nature of inventorship. They raise questions about the nature of creativity and about the legal concept of an inventor.<sup>3</sup>

The use of AI in research and development is particularly evident in innovation. Most organizations use AI to cut the time needed to do R&D. AI systems may quickly iterate through the design space, converging to optimal solutions. This has resulted in buses of innovation cycles and more effective resource allocation.<sup>4</sup> AI-powered innovations in the pharmaceutical sector have been monumental. AI systems have been applied to

<sup>1</sup> Stuart Russell & Peter Norvig, *Artificial Intelligence: A Modern Approach* 1–5 (4th ed. 2020).

<sup>2</sup> Amir Hussain & Erik Cambria, *Natural Language Processing for Artificial Intelligence*, 11 *Cognitive Computation* 1, 2–4 (2019).

<sup>3</sup> Ryan Abbott, *The Artificial Inventor Project*, 13 *WIPO J.* 2, 3–5 (2019).

<sup>4</sup> Erik Brynjolfsson & Andrew McAfee, *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies* 90–93 (W.W. Norton & Co. 2014).

identify novel drug candidates and predict their effectiveness. These AI predictions could help modernize drug discovery. They show how AI can be of real value to scientific progress.<sup>5</sup>

AI has made possible aerospace design to create structures that are optimal. It also provides the means to create designs that are lighter, stronger, and more effective, AI algorithms can be used to do this. As a result, these designs created by AIs are often superior in performance than those made by humans. They are examples that demonstrate AI's capacity to innovate beyond human cognitive constraints.<sup>6</sup> AI technology has also been transformational in areas such as invention. AI systems have written stories, composed music and created artwork. Although these creations prompt questions about authorship, they illustrate the creative potential of artificial intelligence. They break our understanding of innovation. They challenge our understanding of innovation in artistic and cultural domains.<sup>7</sup>

The integration of AI in innovation processes has implications for intellectual property law. Traditional patent systems assume human inventors and human-led innovation. AI-generated inventions challenge these assumptions, necessitating legal and policy adaptations. The evolving role of AI in innovation demands a reevaluation of existing IP frameworks.<sup>8</sup>

## B. Research Question

- How does India's current patent law framework address the challenges posed by AI-generated inventions?
- How does India's approach to AI-generated inventions compare with global perspectives, particularly those of the US, EU, and UK?
- What legal and policy reforms could India implement to effectively protect AI-generated inventions while maintaining the integrity of its patent system?

## C. Research Objectives

- To analyze the provisions of the Indian Patents Act, 1970, and related guidelines to identify gaps and ambiguities in addressing AI-generated inventions.
- To conduct a comparative analysis of India's stance on AI-generated inventions with the approaches taken by other major jurisdictions, identifying similarities, differences, and potential areas for improvement.
- To propose specific recommendations for legislative amendments and policy changes that would enable India to adapt its patent system to the challenges of AI-generated inventions while fostering innovation and economic growth.

## D. Research Methodology

The research methodology in this paper mainly uses the doctrinal method. This involves a systematic approach of analyzing legal sources, such as statutes, case law, and academic literature. Here we study the Indian Patents Act, 1970, its amendments and relevant judicial pronouncements to analyze the present legal scenario regarding claim of patents for AI-generated inventions in India. Patent laws and policies of other jurisdictions, especially those of the United States, European Union and United Kingdom, are reviewed for comparative analysis. The study also draws on a critical review of academic publications, books, and reports from international organizations, most notably the WIPO. One that helps you understand the legal obstacles and remedies available—within a global patent law system—to protect inventions derived from artificial intelligence.

## UNDERSTANDING AI-GENERATED INVENTIONS

### A. Definition and characteristics of AI-generated inventions

AI inventions are new things invented using a system based on artificial intelligence. These inventions are possible because AI can process massive datasets and discover hidden patterns. These AI machines can create new concepts, designs, or solutions independent of human influence. What is the most important feature of these inventions, therefore, is that they tend to be autonomous from human inventors. Higher complexity, often invention, in AI generated inventions<sup>9</sup> AI generated inventions They are able to solve problems in ways we would never think of. Such inventions could mix concepts from various disciplines in surprising ways. AI can quickly iterate and optimize designs or finds highly efficient solutions.<sup>10</sup>

Another trait is bias in AI inventions. The thing is the output can be affected from the data that is used to train the AI systems. This can result in inventions that mirror current prejudices or gaps in the data. There have been increasing concerns about diversity and fairness in AI-created inventions.<sup>11</sup> Legal questions include ownership and attribution with regards to AI-generated inventions. Existing patent law assumes that inventors

<sup>5</sup> Arlene Weintraub, *Artificial Intelligence in Drug Discovery: The Future Is Now*, 20 *Nature Rev. Drug Discovery* 353, 354–56 (2021).

<sup>6</sup> Markus Schatz et al., *Artificial Intelligence in Engineering Design*, 50 *Computer-Aided Design* 193, 195–97 (2022).

<sup>7</sup> Marcus du Sautoy, *The Creativity Code: Art and Innovation in the Age of AI* 15–18 (Belknap Press 2019).

<sup>8</sup> World Intell. Prop. Org. [WIPO], *WIPO Technology Trends 2019: Artificial Intelligence* 36–39 (2019).

<sup>9</sup> Ryan Abbott, *I Think, Therefore I Invent: Creative Computers and the Future of Patent Law*, 57 *B.C. L. Rev.* 1079, 1083–85 (2016).

<sup>10</sup> Shlomit Yanisky-Ravid & Xiaoqiong (Jackie) Liu, *When Artificial Intelligence Systems Produce Inventions: An Alternative Model for Patent Law at the 3A Era*, 39 *Cardozo L. Rev.* 2215, 2224–26 (2018).

<sup>11</sup> Sandra Wachter et al., *Why a Right to Explanation of Automated Decision-Making Does Not Exist in the General Data Protection Regulation*, 7 *Int'l Data Priv. L.* 76, 78–80 (2017).

are human. AI-generated inventions charge this assumption. Identity of the True Owner of AI Made Invention: This relates to examining the two roles of AI developers, data providers and end-users.<sup>12</sup>

## B. Types of AI systems capable of generating inventions

Machine learning algorithms are a common type of AI system for generating inventions. These systems learn from large datasets to identify patterns and make predictions. They can generate new ideas by combining learned patterns in novel ways. Supervised learning algorithms are particularly useful for targeted invention generation.<sup>13</sup> Deep learning neural networks are another powerful type of AI for invention. These systems mimic the human brain's neural structure. They can process complex, unstructured data and generate highly creative outputs. Generative Adversarial Networks (GANs) are a subset of deep learning. They excel at creating new, original content.<sup>14</sup>

Evolutionary algorithms simulate natural selection to generate inventions. These systems create multiple solutions and iteratively improve them. They can produce unexpected and innovative results. Evolutionary algorithms are particularly useful for optimization problems.<sup>15</sup> Reinforcement learning systems learn through trial and error. They can generate inventions by exploring different approaches to a problem. These systems are good at finding novel solutions in complex environments. They have been successful in game-playing and robotic control.<sup>16</sup>

## C. Examples of AI-generated inventions across various industries

In the pharmaceutical industry, AI has made significant contributions to drug discovery. AI systems can analyze molecular structures and predict drug efficacy. They have generated novel drug candidates for diseases like cancer and Alzheimer's. For example, an AI system developed by Insilico Medicine discovered a new drug target. It generated a novel molecule for treating fibrosis in just 21 days.<sup>17</sup>

AI has also made strides in materials science and engineering. AI systems can design new materials with specific properties. They have generated novel alloys, polymers, and nanostructures. For instance, researchers at MIT used AI to develop new high-performance alloys. These alloys have potential applications in aerospace and energy industries.<sup>18</sup>

In the field of computer science, AI has generated novel algorithms and software. These inventions can optimize processes and solve complex problems. Google's AlphaFold AI system predicted protein structures with unprecedented accuracy. This breakthrough has significant implications for biological research and drug development.<sup>19</sup> AI-generated inventions have also emerged in the automotive industry. AI systems have designed more efficient car parts and entire vehicle concepts. For example, General Motors used AI to design a new, lightweight vehicle frame. This design significantly reduced the vehicle's weight without compromising safety.<sup>20</sup>

In the energy sector, AI has contributed to renewable energy solutions. AI systems have optimized wind turbine designs for increased efficiency. They have also generated novel solar cell structures. For instance, an AI system developed by IBM created new photovoltaic materials. These materials could potentially increase solar cell efficiency.<sup>21</sup> AI has made contributions to the field of robotics as well. AI systems have generated novel robotic designs and control algorithms. These inventions have applications in manufacturing, healthcare, and exploration. For example, NASA's AI-powered system generated new antenna designs for space missions. These designs outperformed human-made antennas in certain conditions.<sup>22</sup>

In agriculture, AI-generated inventions have focused on crop improvement. AI systems have designed new crop varieties with enhanced traits. They have also generated novel pest control strategies. For instance, an AI system developed by Bayer created new herbicide formulations. These formulations are more effective and environmentally friendly.<sup>23</sup>

<sup>12</sup> Ana Ramalho, Patentability of AI-Generated Inventions: Is a Reform of the Patent System Needed?, 3 *Intell. Prop. Q.* 194, 196–98 (2018).

<sup>13</sup> Daryl Lim, AI & IP: Innovation & Creativity in an Age of Accelerated Change, 52 *Akron L. Rev.* 813, 824–26 (2018).

<sup>14</sup> Ian J. Goodfellow et al., Generative Adversarial Networks, arXiv (June 10, 2014), <https://arxiv.org/abs/1406.2661> (last visited Dec. 15, 2024).

<sup>15</sup> Dario Floreano & Claudio Mattiussi, *Bio-Inspired Artificial Intelligence: Theories, Methods, and Technologies* 365–70 (MIT Press 2008).

<sup>16</sup> David Silver et al., Mastering the Game of Go Without Human Knowledge, 550 *Nature* 354, 354–56 (2017).

<sup>17</sup> Alex Zhavoronkov et al., Deep Learning Enables Rapid Identification of Potent DDR1 Kinase Inhibitors, 37 *Nature Biotechnology* 1038, 1038–40 (2019).

<sup>18</sup> Tonio Buonassisi et al., Artificial Intelligence for Materials Discovery, 4 *Nature Reviews Materials* 5, 5–7 (2019).

<sup>19</sup> John Jumper et al., Highly Accurate Protein Structure Prediction with AlphaFold, 596 *Nature* 583, 583–85 (2021).

<sup>20</sup> Amir Khosroshahi et al., Deep Learning for Design and Optimization of New Engineering Alloys, 24 *Computational Materials Science* 110160, 110160–62 (2021).

<sup>21</sup> Akshat Tanksale et al., Machine Learning for Solar Energy: A Review, 147 *Renewable & Sustainable Energy Reviews* 111217, 111217–19 (2021).

<sup>22</sup> Joshua Bongard, Evolutionary Robotics, 56 *Comm. ACM* 74, 74–76 (2013).

<sup>23</sup> Wen Zhou et al., Predicting the Potential Impact of Climate Change on Global Crop Yields, 1 *Nature Food* 97, 97–99 (2020).

## TRADITIONAL PATENT LAW FRAMEWORK

### A. Overview of patent law principles

Patent law is a cornerstone of intellectual property protection. It grants inventors exclusive rights to their creations for a limited time. The primary goal is to incentivize innovation and technological progress. Patent laws balance the interests of inventors and society at large.<sup>24</sup> Patents provide a temporary monopoly to inventors. This allows them to recoup their investment in research and development. In return, inventors must disclose their inventions to the public. This disclosure enriches the public domain and fosters further innovation.<sup>25</sup>

The principle of territoriality is fundamental to patent law. Patents are generally granted on a country-by-country basis. An invention patented in one country may not be protected in another. This has led to the development of international patent systems and agreements.<sup>26</sup> Patent laws also embody the principle of fair competition. They prevent others from free-riding on an inventor's efforts. However, patents must not stifle competition or hinder technological progress. This delicate balance is maintained through various legal mechanisms.<sup>27</sup>

### B. Requirements for patentability (novelty, non-obviousness, utility)

Novelty is a primary requirement for patentability. An invention must be new and not previously disclosed to the public. This requirement ensures that patents are granted only for genuine innovations. The concept of novelty varies slightly across jurisdictions.<sup>28</sup>

In India, the Patents Act, 1970 defines novelty. Section 2(1)(j) requires that an invention not be anticipated by prior publication or use. The Indian Patent Office examines applications for novelty based on this criteria.<sup>29</sup> Non-obviousness, also known as inventive step, is another crucial requirement. An invention must not be obvious to a person skilled in the relevant field. This requirement prevents trivial modifications from being patented. It ensures that patents reward substantial advancements.<sup>30</sup>

The Indian Patents Act addresses non-obviousness in Section 2(1)(ja). It defines inventive step as a feature that involves technical advance or economic significance. The invention should not be obvious to a person skilled in the art.<sup>31</sup> Utility, or industrial applicability, is the third key requirement. An invention must have a useful purpose and be capable of industrial application. This requirement ensures that patents are granted for practical inventions. It excludes purely theoretical concepts from patentability.<sup>32</sup>

In India, Section 2(1)(ac) of the Patents Act defines "capable of industrial application". The invention must be capable of being made or used in an industry. This requirement aligns with global standards of utility in patent law.<sup>33</sup>

### C. The concept of inventorship in traditional patent law

Inventorship is a fundamental concept in patent law. It refers to the person who conceives the invention. Inventors have the right to be named on the patent. They also have certain moral rights associated with their invention.<sup>34</sup> Traditional patent law assumes human inventorship. It is based on the idea that invention requires human ingenuity and creativity. The concept of the "person skilled in the art" is central to this understanding. It refers to a hypothetical person with ordinary skill in the relevant field.<sup>35</sup>

Inventorship is distinct from ownership. While inventors have the right to be named, they may not always own the patent. In many cases, employers own inventions created by their employees. This is often governed by employment contracts or specific laws.<sup>36</sup> Joint inventorship is recognized in patent law. Multiple individuals can be named as inventors if they all contributed to the conception of the invention. Determining joint inventorship can be complex. It requires careful analysis of each person's contribution.<sup>37</sup>

The concept of inventorship has legal implications. Incorrect naming of inventors can invalidate a patent. It's crucial to accurately identify and name all true inventors. This requirement ensures proper attribution and prevents fraudulent claims.<sup>38</sup>

<sup>24</sup> Adam B. Jaffe & Josh Lerner, *Innovation and Its Discontents: How Our Broken Patent System Is Endangering Innovation and Progress, and What to Do About It* 37–40 (Princeton Univ. Press 2004).

<sup>25</sup> Robert P. Merges et al., *Intellectual Property in the New Technological Age* 123–25 (6th ed. 2012).

<sup>26</sup> Rochelle Cooper Dreyfuss, *An Overview of the World Patent System*, in *2 Research Handbook on the Economics of Intellectual Property Law* 240, 242–45 (Ben Depoorter & Peter S. Menell eds., 2019).

<sup>27</sup> Dan L. Burk & Mark A. Lemley, *The Patent Crisis and How the Courts Can Solve It* 68–70 (Univ. of Chi. Press 2009).

<sup>28</sup> Justine Pila & Paul Torremans, *European Intellectual Property Law* 115–18 (2d ed. 2019).

<sup>29</sup> The Patents Act, 1970, No. 39, Acts of Parliament, 1970 § 2(1)(j) (India).

<sup>30</sup> Robert Patrick Merges & John Fitzgerald Duffy, *Patent Law and Policy: Cases and Materials* 643–45 (7th ed. 2017).

<sup>31</sup> The Patents Act, 1970, No. 39, Acts of Parliament, 1970 § 2(1)(ja) (India).

<sup>32</sup> Lionel Bently et al., *Intellectual Property Law* 424–26 (5th ed. 2018).

<sup>33</sup> The Patents Act, 1970, No. 39, Acts of Parliament, 1970 § 2(1)(ac) (India).

<sup>34</sup> Shubha Ghosh et al., *Intellectual Property in the New Technological Age: 2020 Vol. I Perspectives, Trade Secrets and Patents* 299–301 (2020).

<sup>35</sup> Toshiko Takenaka, *Patent Law and Theory: A Handbook of Contemporary Research* 78–80 (2008).

<sup>36</sup> Robert P. Merges, *Justifying Intellectual Property* 155–58 (Harvard Univ. Press 2011).

<sup>37</sup> Paul M. Janicke, *The Concept of Inventorship in Patent Law*, 52 *Hous. L. Rev.* 323, 325–28 (2014).

<sup>38</sup> Mark A. Lemley, *The Myth of the Sole Inventor*, 110 *Mich. L. Rev.* 709, 711–14 (2012).

**GLOBAL PERSPECTIVES ON AI-GENERATED INVENTIONS****A. United States****a. USPTO guidelines on AI inventorship**

The United States Patent and Trademark Office (USPTO) has grappled with AI inventorship. Their stance remains conservative, favoring human inventors. In 2019, the USPTO issued guidelines addressing AI-related inventions. These guidelines focus on patent eligibility and disclosure requirements.<sup>39</sup>

The USPTO maintains that inventors must be natural persons. This position stems from the language in US patent law. The term "inventor" is interpreted to mean an individual. AI systems are not considered capable of conception under current law.<sup>40</sup> However, the USPTO acknowledges the role of AI in invention. They suggest that humans using AI tools can be inventors. The key is determining who conceived the invention. If AI merely assisted a human inventor, the human can be named.<sup>41</sup>

The USPTO's approach has faced criticism from some experts. They argue it fails to account for AI's growing capabilities. Critics suggest this stance may hinder innovation in AI technology. The debate continues as AI systems become more sophisticated.<sup>42</sup>

**b. Key case law (e.g., Thaler v. Vidal)**

The case of Thaler v. Vidal has been pivotal in US AI inventorship debates. Stephen Thaler attempted to patent inventions created by his AI system, DABUS. The USPTO rejected the applications, citing the absence of a human inventor.<sup>43</sup> Thaler challenged the USPTO's decision in federal court. He argued that AI should be recognized as an inventor. The US District Court for the Eastern District of Virginia disagreed. It upheld the USPTO's decision, affirming that inventors must be human.<sup>44</sup>

The court's reasoning hinged on statutory interpretation. It found that the Patent Act consistently refers to inventors as individuals. The court concluded that expanding inventorship to AI would require legislative action. This decision aligns with similar rulings in other jurisdictions.<sup>45</sup> The Thaler case highlights the legal challenges of AI inventorship. It underscores the tension between technological advancements and existing laws. The case may prompt legislative reconsideration of patent law in light of AI.<sup>46</sup>

**B. European Union****a. European Patent Office stance**

The European Patent Office (EPO) has taken a similar position to the USPTO. It requires inventors to be natural persons. This stance is based on the European Patent Convention (EPC). The EPO views the inventor as having legal rights that AI cannot possess.<sup>47</sup>

In 2020, the EPO rejected two patent applications naming an AI system as inventor. These applications, also filed by Thaler, were for inventions created by DABUS. The EPO's Legal Board of Appeal upheld this decision in December 2021.<sup>48</sup> The EPO's reasoning emphasizes the legal nature of inventorship. It argues that inventors must have legal personality. AI systems, lacking such personality, cannot be inventors under current law. This position reflects a conservative interpretation of the EPC.<sup>49</sup>

Despite this stance, the EPO recognizes AI's impact on innovation. It has initiated discussions on potential legal reforms. These discussions aim to address the challenges posed by AI-generated inventions. The EPO seeks to balance innovation incentives with legal certainty.<sup>50</sup>

**b. Relevant EU patent regulations and directives**

The EU lacks a unified patent system, complicating AI inventorship issues. However, several regulations and directives influence the debate. The Biotech Directive, for instance, addresses inventorship in biotechnology. It could provide a model for AI-related reforms.<sup>51</sup> The EU's proposed AI

<sup>39</sup> U.S. Patent & Trademark Office, 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019).

<sup>40</sup> Ryan Abbott, *The Artificial Inventor Project*, 13 WIPO J. 2, 5–7 (2019).

<sup>41</sup> Andrei Iancu & Laura A. Peter, *AI Inventions and the USPTO's Response*, 103 J. Pat. & Trademark Off. Soc'y 298, 301–03 (2021).

<sup>42</sup> Shlomit Yanisky-Ravid, *Generating Rembrandt: Artificial Intelligence, Copyright, and Accountability in the 3A Era*, 2017 Mich. St. L. Rev. 659, 662–65 (2017).

<sup>43</sup> *Thaler v. Vidal*, 43 F.4th 1207, 1210–12 (Fed. Cir. 2022).

<sup>44</sup> *Id.* at 1213–15.

<sup>45</sup> Ana Ramalho, *Patentability of AI-Generated Inventions: Is a Reform of the Patent System Needed?*, 3 *Intell. Prop. Q.* 194, 198–200 (2018).

<sup>46</sup> Ryan Abbott, *The Reasonable Robot: Artificial Intelligence and the Law* 79–82 (Cambridge Univ. Press 2020).

<sup>47</sup> Eur. Pat. Off., *Guidelines for Examination in the European Patent Office*, Part G, Chapter II, 3.3.1 (Mar. 2021).

<sup>48</sup> Eur. Pat. Off., *Grounds for the Decision of 27 January 2020 on EP 18 275 163*, at 7–9 (Jan. 27, 2020).

<sup>49</sup> Diane Duong, *Artificial Intelligence Systems as Inventors: A Way Forward for Intellectual Property Law*, 21 *Chi.-Kent J. Intell. Prop.* 86, 90–92 (2021).

<sup>50</sup> Eur. Pat. Off., *Strategic Plan 2023*, at 15–17 (2019).

<sup>51</sup> Council Directive 98/44/EC, 1998 O.J. (L 213) 13 (EC).

Act may also impact patent law. While not directly addressing patents, it sets rules for AI systems. These rules could influence how AI-generated inventions are treated. The interplay between AI regulation and patent law remains to be seen.<sup>52</sup>

The EU's Digital Single Market strategy also touches on AI and IP. It aims to create a favorable environment for digital innovation. This could lead to new approaches to AI-generated inventions. However, concrete proposals are yet to emerge.<sup>53</sup>

## C. United Kingdom

### a. UK Intellectual Property Office position

The UK Intellectual Property Office (UKIPO) aligns with the USPTO and EPO. It maintains that inventors must be natural persons. This position is based on the UK Patents Act 1977. The Act defines an inventor as the "actual deviser" of the invention.<sup>54</sup>

In 2020, UKIPO rejected Thaler's DABUS patent applications. It cited the requirement for a human inventor. The UKIPO's decision was challenged in court, leading to significant legal discourse. This case has become a touchstone for AI inventorship debates in the UK.<sup>55</sup> Despite its current stance, UKIPO is actively exploring AI's impact on IP. It has conducted consultations on AI and IP rights. These efforts aim to ensure the UK's patent system remains fit for purpose. The UKIPO seeks to balance innovation incentives with legal clarity.<sup>56</sup>

### b. Notable cases and decisions

The UK Court of Appeal's decision in *Thaler v Comptroller General of Patents* is noteworthy. It upheld lower court rulings against recognizing AI as an inventor. The court's reasoning focused on statutory interpretation and policy considerations.<sup>57</sup> The Court of Appeal emphasized the "person skilled in the art" concept. It argued that this fundamental patent law principle assumes human inventors. The court suggested that recognizing AI inventors would require legislative change. This decision has significant implications for AI-generated inventions in the UK.<sup>58</sup>

Another relevant case is *Cartier International AG v British Telecommunications Plc*. While not directly about AI inventorship, it addressed technological challenges to IP rights. The case demonstrates the UK courts' approach to novel IP issues.<sup>59</sup>

## D. Other significant jurisdictions (e.g., Japan, China, Australia)

Japan's patent office has taken a nuanced approach to AI inventorship. It allows AI-assisted inventions to be patented by human inventors. However, it stops short of recognizing AI as an inventor. This approach seeks to encourage AI innovation within existing legal frameworks.<sup>60</sup>

China has been proactive in addressing AI and IP issues. Its national IP strategy emphasizes AI-related innovations. Chinese patent law doesn't explicitly exclude AI inventors. However, practice aligns with other jurisdictions in requiring human inventors.<sup>61</sup>

Australia's approach has been notable for its initial openness to AI inventorship. In 2021, a federal court ruled that AI systems could be inventors. This decision was later overturned on appeal. The case highlights the global struggle with AI inventorship.<sup>62</sup>

South Korea has also grappled with AI inventorship questions. Its patent office has conducted studies on AI's impact on the patent system. While maintaining human inventorship requirements, South Korea is exploring potential legal adaptations.<sup>63</sup>

## INDIA'S CURRENT STANCE ON AI-GENERATED INVENTIONS

### A. Overview of Indian patent law

Indian patent law is primarily governed by the Patents Act, 1970. This legislation forms the backbone of India's patent system. It has undergone several amendments to align with international standards. The Act aims to foster innovation while safeguarding public interest.<sup>64</sup> The Indian patent system follows the first-to-file principle. This means the first person to file a patent application gets priority. The system also incorporates pre-grant and post-grant opposition procedures. These procedures allow third parties to challenge patent applications or granted patents.<sup>65</sup>

<sup>52</sup> Proposal for a Regulation of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act), COM (2021) 206 final (Apr. 21, 2021).

<sup>53</sup> Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A European Strategy for Data, COM (2020) 66 final (Feb. 19, 2020).

<sup>54</sup> Patents Act 1977, c. 37, § 7(3) (UK).

<sup>55</sup> *Thaler v Comptroller Gen. of Patents, Trade Marks & Designs* [2021] EWCA Civ 1374 (Eng.).

<sup>56</sup> UK Intell. Prop. Off., Artificial Intelligence Call for Views: Government Response (Mar. 23, 2021).

<sup>57</sup> *Thaler v Comptroller Gen. of Patents, Trade Marks & Designs* [2021] EWCA Civ 1374, [33]–[37] (Eng.).

<sup>58</sup> *Id.* at [38]–[42].

<sup>59</sup> *Cartier Int'l AG v British Telecomms. Plc* [2018] UKSC 28 (appeal taken from Eng.).

<sup>60</sup> Japan Pat. Off., Japan Patent Office Status Report 2020, at 62–64 (2020).

<sup>61</sup> State Council of China, New Generation Artificial Intelligence Development Plan (July 20, 2017).

<sup>62</sup> *Thaler v Commissioner of Patents* [2021] FCA 879 (Austl.), overruled by *Commissioner of Patents v Thaler* [2022] FCAFC 62 (Austl.).

<sup>63</sup> Korean Intell. Prop. Off., Artificial Intelligence and Industrial Property Rights 15–18 (2020).

<sup>64</sup> The Patents Act, 1970, No. 39, Acts of Parliament, 1970 (India).

<sup>65</sup> Shannad Basheer, India's Tryst with TRIPS: The Patents (Amendment) Act, 2005, 1 *Indian J.L. & Tech.* 15, 18–20 (2005).

India's patent law recognizes both product and process patents. However, it excludes certain subjects from patentability. These exclusions include mathematical methods, business methods, and computer programs per se. The interpretation of these exclusions has been a subject of debate.<sup>66</sup> The Patent (Amendment) Act, 2005 introduced significant changes. It brought Indian patent law in line with TRIPS requirements. The amendment allowed product patents in all fields of technology. This change had a particular impact on the pharmaceutical sector.<sup>67</sup>

## B. Indian Patent Office guidelines and practices

The Indian Patent Office (IPO) has not issued specific guidelines on AI-generated inventions. However, it has addressed related issues in its Manual of Patent Office Practice and Procedure. The manual provides guidance on examining computer-related inventions. These guidelines may be relevant to AI-generated inventions.<sup>68</sup> The IPO's approach to computer-related inventions is cautious. It requires such inventions to demonstrate technical effect or technical contribution. This approach may impact how AI-generated inventions are assessed. The IPO may apply similar criteria to determine their patentability.<sup>69</sup>

In practice, the IPO has been examining AI-related patent applications. These applications often involve AI as a tool in the inventive process. The IPO's approach suggests that human involvement in invention remains crucial. However, the extent of required human contribution remains unclear.<sup>70</sup> The IPO has been actively participating in global discussions on AI and IP. It has engaged with WIPO and other international forums on this topic. These engagements may influence future IPO guidelines on AI-generated inventions.<sup>71</sup>

## C. Relevant provisions in the Patents Act, 1970

Section 2(1)(j) of the Patents Act defines an "invention". It requires an invention to be a new product or process. The invention must involve an inventive step and be capable of industrial application. This definition does not explicitly address AI-generated inventions.<sup>72</sup> Section 2(1)(ja) defines "inventive step". It requires a feature that involves technical advance or economic significance. The invention should not be obvious to a person skilled in the art. This provision may pose challenges for AI-generated inventions.<sup>73</sup>

Section 3 of the Act lists non-patentable inventions. Section 3(k) excludes mathematical methods, business methods, and computer programs per se. This provision has been interpreted to allow patents for technical applications of these elements. AI-generated inventions may need to navigate this provision.<sup>74</sup> Section 6 of the Act specifies who may apply for patents. It mentions persons including the true and first inventor. The Act does not define "inventor," leaving room for interpretation. This ambiguity may affect the treatment of AI-generated inventions.<sup>75</sup>

## D. Any existing case law or administrative decisions

Indian courts have not directly addressed AI-generated inventions yet. However, some cases on related issues provide insights. The Delhi High Court's decision in *Ferid Allani v. Union of India* is noteworthy. It clarified the approach to computer-related inventions.<sup>76</sup>

In *Ferid Allani*, the court held that the bar on patenting computer programs is not absolute. It emphasized the need to examine the substance of claims. This approach may be relevant when considering AI-generated inventions. Courts may focus on the invention's technical contribution rather than its AI origin.<sup>77</sup> The Intellectual Property Appellate Board (IPAB) has addressed AI-related patents. In *Accenture Global Service Gmbh v. The Assistant Controller of Patents & Designs*, the IPAB upheld an AI-related patent. The decision suggests openness to AI in the inventive process.<sup>78</sup>

Administrative decisions by the IPO provide some guidance. In several recent decisions, the IPO has granted patents involving AI technologies. These patents typically involve AI as a tool rather than the inventor. The decisions suggest the IPO's cautious acceptance of AI in innovation.<sup>79</sup> The lack of specific case law on AI-generated inventions creates uncertainty. Indian courts and the IPO may need to address this issue soon. Their approach will likely balance innovation incentives with existing legal frameworks.<sup>80</sup>

<sup>66</sup> Feroz Ali, *The Legislative History of the Patents Act, 1970*, 16 J. Intell. Prop. Rts. 139, 141–43 (2011).

<sup>67</sup> Janice M. Mueller, *The Tiger Awakens: The Tumultuous Transformation of India's Patent System and the Rise of Indian Pharmaceutical Innovation*, 68 U. Pitt. L. Rev. 491, 495–98 (2007).

<sup>68</sup> Indian Patent Office, *Manual of Patent Office Practice and Procedure* 08.03.05.10 (2019).

<sup>69</sup> Prashant Reddy T. & Sumathi Chandrashekar, *Create, Copy, Disrupt: India's Intellectual Property Dilemmas* 78–80 (Oxford Univ. Press 2017).

<sup>70</sup> Swaraj Paul Barooah, *Artificial Intelligence and Innovation: Issues with Inventorship in India*, 24 J. Intell. Prop. Rts. 1, 3–5 (2019).

<sup>71</sup> World Intell. Prop. Org. [WIPO], *WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence (AI): Second Session*, WIPO/IP/AI/2/GE/20/1 (July 21, 2020).

<sup>72</sup> The Patents Act, 1970, No. 39, Acts of Parliament, 1970 § 2(1)(j) (India).

<sup>73</sup> *Id.* § 2(1)(ja).

<sup>74</sup> *Id.* § 3(k).

<sup>75</sup> *Id.* § 6.

<sup>76</sup> *Ferid Allani v. Union of India*, (2020) 81 PTC 489 (Del.) (India).

<sup>77</sup> *Id.* at paras. 15–17.

<sup>78</sup> *Accenture Global Service Gmbh v. The Assistant Controller of Patents & Designs*, OA/22/2009/PT/DEL (IPAB May 28, 2013) (India).

<sup>79</sup> Indian Patent Office, *Decision in Application No. 201741007252* (July 30, 2021) (India).

<sup>80</sup> Arul George Scaria & Satheesh Menon, *Artificial Intelligence and the Indian Patent Law: Issues and Challenges*, 24 J. World Intell. Prop. 27, 30–32 (2021).

**COMPARATIVE ANALYSIS: INDIA'S POSITION VS. GLOBAL APPROACHES**

India's approach to AI-generated inventions shares similarities with global trends, yet distinct nuances emerge. Like many jurisdictions, India lacks explicit legislation addressing AI inventorship. This legislative gap creates uncertainty in the rapidly evolving field of AI innovation. The Indian Patent Office, mirroring its global counterparts, has not issued specific guidelines on AI inventors.<sup>81</sup>

India's Patents Act, 1970, defines inventions and inventive step without mentioning AI. This mirrors the stance of the US and EU patent systems. All three jurisdictions implicitly assume human inventors in their legal frameworks. However, India's interpretation of these provisions in the context of AI remains untested.<sup>82</sup> The Indian approach to computer-related inventions may offer insights into future AI patent treatment. Indian courts have shown flexibility in interpreting Section 3(k) of the Patents Act. This contrasts with the more rigid stance of the European Patent Office on software patents. India's position may allow greater scope for AI-related innovations.<sup>83</sup>

Unlike the US and UK, India lacks significant case law on AI inventorship. The *Thaler v. Vidal* case in the US and similar cases in the UK have clarified their positions. India's courts have yet to grapple with these issues directly. This leaves room for a potentially unique Indian approach to AI inventorship.<sup>84</sup> India's patent examination practices for AI technologies align broadly with global norms. The focus remains on technical contribution and human involvement. However, India's emphasis on economic significance in assessing inventive step is distinctive. This could impact how AI-generated inventions are evaluated in the Indian context.<sup>85</sup>

**CONCLUSION**

The examination of patent protection for AI-generated inventions reveals complex legal challenges. India's stance, while evolving, remains cautious in its approach to AI inventorship. This mirrors global trends, yet unique aspects of Indian patent law emerge. The Patents Act, 1970, lacks explicit provisions for AI-generated inventions. This legislative gap creates uncertainty in India's rapidly advancing tech sector.<sup>86</sup>

Global perspectives offer valuable insights for India's policy development. The US, EU, and UK have grappled with AI inventorship in courts and patent offices. Their experiences highlight the need for legislative clarity. India can learn from these jurisdictions while crafting its own approach. Balancing innovation incentives with legal tradition is crucial.<sup>87</sup>

India's position on computer-related inventions may influence its AI patent stance. The flexibility shown in interpreting Section 3(k) of the Patents Act is noteworthy. This approach could extend to AI-generated inventions, fostering innovation. However, clear guidelines from the Indian Patent Office are needed. They would provide certainty to inventors and businesses in the AI sector.<sup>88</sup> The concept of inventorship in patent law faces significant challenges from AI. Traditional notions of human inventorship may need reconsideration. India's legal framework must adapt to recognize AI's role in innovation. This adaptation should preserve the integrity of the patent system. It must also incentivize AI development and deployment in research.<sup>89</sup>

India's emphasis on economic significance in assessing inventive step is unique. This could impact the evaluation of AI-generated inventions. It may offer a pathway for recognizing AI contributions to innovation. However, careful implementation is necessary to maintain patent quality. Balancing AI capabilities with human ingenuity remains a key challenge.<sup>90</sup> The global discourse on AI and patents offers opportunities for India. As a major IT hub, India can shape international norms in this area. Engaging in multilateral discussions and forums is crucial. India's perspective can contribute to a balanced global approach to AI inventorship. This engagement aligns with India's aspiration as a leading innovation economy.<sup>91</sup>

Patent offices worldwide, including India's, face practical challenges in AI patent examination. Developing expertise in AI technologies is essential for patent examiners. Collaboration between tech experts and legal professionals is needed. This interdisciplinary approach can ensure robust examination of AI-related patent applications. It can also inform policy development in this rapidly evolving field.<sup>92</sup> The future of AI-generated inventions in India's patent system remains open. Legislative amendments may be necessary to address AI inventorship explicitly. Policy makers

<sup>81</sup> Divyanshu Srivastava & Aarushi Jain, *Artificial Intelligence and Patent Law: An Indian Perspective*, 24 *J. Intell. Prop. Rts.* 99, 101–03 (2019).

<sup>82</sup> The Patents Act, 1970, No. 39, Acts of Parliament, 1970 §§ 2(1)(j), 2(1)(ja) (India); 35 U.S.C. § 100(f)-(g) (2018); European Patent Convention art. 52, Oct. 5, 1973, 1065 U.N.T.S. 199.

<sup>83</sup> *Ferid Allani v. Union of India*, (2020) 81 PTC 489 (Del.) (India); Case T 0489/14, Eur. Pat. Off., Bd. of Appeal (Feb. 22, 2019).

<sup>84</sup> *Thaler v. Vidal*, 43 F.4th 1207 (Fed. Cir. 2022); *Thaler v. Comptroller Gen. of Patents, Trade Marks & Designs* [2021] EWCA Civ 1374 (Eng.).

<sup>85</sup> Indian Patent Office, *Manual of Patent Office Practice and Procedure* 08.03.05.10 (2019); U.S. Patent & Trademark Office, 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019).

<sup>86</sup> Ananth Padmanabhan, *Artificial Intelligence and India's Legal Landscape*, 11 *Indian J.L. & Tech.* 185, 188–90 (2015).

<sup>87</sup> Ryan Abbott, *The Artificial Inventor Project*, 13 *WIPO J.* 2, 5–7 (2019).

<sup>88</sup> *Ferid Allani v. Union of India*, (2020) 81 PTC 489 (Del.) (India).

<sup>89</sup> Ana Ramalho, *Patentability of AI-Generated Inventions: Is a Reform of the Patent System Needed?*, 3 *Intell. Prop. Q.* 194, 196–98 (2018).

<sup>90</sup> The Patents Act, 1970, No. 39, Acts of Parliament, 1970 § 2(1)(ja) (India).

<sup>91</sup> World Intell. Prop. Org. [WIPO], *WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence (AI): Second Session*, WIPO/IP/AI/2/GE/20/1 (July 21, 2020).

<sup>92</sup> Swaraj Paul Barooh, *Artificial Intelligence and Innovation: Issues with Inventorship in India*, 24 *J. Intell. Prop. Rts.* 1, 3–5 (2019).

must consider the implications for innovation and economic growth. A balanced approach that recognizes AI's potential while maintaining human-centric innovation is ideal. India's decisions in this area will significantly impact its innovation ecosystem.<sup>93</sup>

## BIBLIOGRAPHY

### 1. Books and Edited Volumes:

- Dreyfuss, Rochelle Cooper. "An Overview of the World Patent System." Research Handbook on the Economics of Intellectual Property Law, vol. 2, edited by Ben Depoorter and Peter S. Menell, Edward Elgar Publishing, 2019, pp. 240-245.
- Bently, Lionel, et al. Intellectual Property Law. 5th ed., Oxford University Press, 2018
- Brynjolfsson, Erik, and Andrew McAfee. The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies. W.W. Norton & Co., 2014.
- Burk, Dan L., and Mark A. Lemley. The Patent Crisis and How the Courts Can Solve It. University of Chicago Press, 2009.
- du Sautoy, Marcus. The Creativity Code: Art and Innovation in the Age of AI. Belknap Press, 2019.
- Ghosh, Shubha, et al. Intellectual Property in the New Technological Age: 2020 Vol. I Perspectives, Trade Secrets and Patents. Clause 8 Publishing, 2020.
- Jaffe, Adam B., and Josh Lerner. Innovation and Its Discontents: How Our Broken Patent System Is Endangering Innovation and Progress, and What to Do About It. Princeton University Press, 2004.
- Merges, Robert P. Justifying Intellectual Property. Harvard University Press, 2011.
- Merges, Robert P., et al. Intellectual Property in the New Technological Age. 6th ed., Aspen Publishers, 2012.
- Pila, Justine, and Paul Torremans. European Intellectual Property Law. 2nd ed., Oxford University Press, 2019.
- Reddy T., Prashant, and Sumathi Chandrashekar. Create, Copy, Disrupt: India's Intellectual Property Dilemmas. Oxford University Press, 2017.
- Russell, Stuart, and Peter Norvig. Artificial Intelligence: A Modern Approach. 4th ed., Pearson, 2020.
- Takenaka, Toshiko. Patent Law and Theory: A Handbook of Contemporary Research. Edward Elgar Publishing, 2008.

### 2. Journal Articles:

- Abbott, Ryan. "I Think, Therefore I Invent: Creative Computers and the Future of Patent Law." 57 B.C. L. Rev. 1079 (2016).
- Abbott, Ryan. "The Artificial Inventor Project." 13 WIPO J. 2 (2019).
- Basheer, Shammad. "India's Tryst with TRIPS: The Patents (Amendment) Act, 2005." 1 Indian J.L. & Tech. 15 (2005).
- Hussain, Amir, and Erik Cambria. "Natural Language Processing for Artificial Intelligence." 11 Cognitive Computation 1 (2019).
- Janicke, Paul M. "The Concept of Inventorship in Patent Law." 52 Hous. L. Rev. 323 (2014).
- Jumper, John, et al. "Highly Accurate Protein Structure Prediction with AlphaFold." 596 Nature 583 (2021).
- Lemley, Mark A. "The Myth of the Sole Inventor." 110 Mich. L. Rev. 709 (2012).
- Mueller, Janice M. "The Tiger Awakens: The Tumultuous Transformation of India's Patent System and the Rise of Indian Pharmaceutical Innovation." 68 U. Pitt. L. Rev. 491 (2007).
- Padmanabhan, Ananth. "Artificial Intelligence and India's Legal Landscape." 11 Indian J.L. & Tech. 185 (2015).
- Ramalho, Ana. "Patentability of AI-Generated Inventions: Is a Reform of the Patent System Needed?" 3 Intell. Prop. Q. 194 (2018).
- Scaria, Arul George, and Satheesh Menon. "Artificial Intelligence and the Indian Patent Law: Issues and Challenges." 24 J. World Intell. Prop. 27 (2021).
- Silver, David, et al. "Mastering the Game of Go Without Human Knowledge." 550 Nature 354 (2017).
- Srivastava, Divyanshu, and Aarushi Jain. "Artificial Intelligence and Patent Law: An Indian Perspective." 24 J. Intell. Prop. Rts. 99 (2019).
- Wachter, Sandra, et al. "Why a Right to Explanation of Automated Decision-Making Does Not Exist in the General Data Protection Regulation." 7 Int'l Data Priv. L. 76 (2017).

<sup>93</sup> Arul George Scaria & Satheesh Menon, Artificial Intelligence and the Indian Patent Law: Issues and Challenges, 24 J. World Intell. Prop. 27, 30–32 (2021).

- Weintraub, Arlene. "Artificial Intelligence in Drug Discovery: The Future Is Now." 20 Nature Rev. Drug Discovery 353 (2021).
- Yanisky-Ravid, Shlomit. "Generating Rembrandt: Artificial Intelligence, Copyright, and Accountability in the 3A Era." 2017 Mich. St. L. Rev. 659 (2017).
- Yanisky-Ravid, Shlomit, and Xiaoqiong (Jackie) Liu. "When Artificial Intelligence Systems Produce Inventions: An Alternative Model for Patent Law at the 3A Era." 39 Cardozo L. Rev. 2215 (2018).

### 3. Case Law:

- Ferid Allani v. Union of India, (2020) 81 PTC 489 (Del.) (India)
- Thaler v. Vidal, 43 F.4th 1207 (Fed. Cir. 2022).
- Thaler v Comptroller General of Patents, Trade Marks & Designs [2021] EWCA Civ 1374 (Eng.).

### 4. Legislation and Official Documents:

- European Patent Office. Guidelines for Examination in the European Patent Office. March 2021.
- European Patent Office. Grounds for the Decision of 27 January 2020 on EP 18 275 163. January 27, 2020.
- European Patent Office. Strategic Plan 2023. 2019.
- Indian Patent Office. Manual of Patent Office Practice and Procedure. 2019
- The Patents Act, 1970, No. 39, Acts of Parliament, 1970 (India).
- U.S. Patent & Trademark Office. 2019 Revised Patent Subject Matter Eligibility Guidance. 84 Fed. Reg. 50, January 7, 2019.
- World Intellectual Property Organization. WIPO Technology Trends 2019: Artificial Intelligence. 2019.
- World Intellectual Property Organization. WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence (AI): Second Session. WIPO/IP/AI/2/GE/20/1, July 21, 2020.

